

detail. The proportion of the area to be occupied by the public thoroughfares, promenades, avenues, and private gardens is fully discussed. By a most ingenious and original plan of allotment, each house in the city stands in its own ground without being unduly overlooked or interfered with by neighbouring dwellings, but at the same time fitting harmoniously into the whole. Instead of the usual oblong or rectangular arrangement, the author subdivides the ground into polygonal or, more precisely, hexagonal plots. This he shows preserves a uniform frontage length, and at the same time admits of great elasticity as regards the size of the allotments which different inhabitants may desire.

The city proposed by the author would consist of three separate areas, viz. the city proper, the village with its industrial zone, and the agricultural fringe. Each department is so arranged and laid out that the maximum amount of comfort and utility is combined with the minimum amount of expense. The city as a whole is so designed that it shall be self-supporting. All needless expense and extravagance are scrupulously avoided. The artisan's dwelling is made for the artisan, and the same applies to the housing of every grade and class of society. All are suitably provided for. Public buildings and offices, railway stations, &c., are grouped together within easy access of each other in the centre of the city.

The sanitary and hygienic conditions of every kind are treated in an able and scientific manner. Every health-promoting device that ingenuity can suggest is brought forward in its proper place. It is beyond the scope of a review to mention these in detail. Suffice it to say that nothing is suggested which cannot be easily put into practice; and, further, many of the author's valuable and common-sense suggestions might with great advantage be adopted in our present cities.

The sociological aspect of garden cities is treated in a rational and scientific manner. The doctrine of "equality" which was urged by some when the site of the first garden city was acquired is relegated to its proper place by the author, who reminds his readers that the outcry for equality has proved the curse of industrial England, and points out the absurdity of ranking the "loungers—the quasi-inert and industrially passive atoms—as of equal national value to the active workers or energy-imparting unit." The decentralisation of industry is one of the great objects of garden cities—hence the authorities can deal with nothing below the industrial unit.

Under the heading "Charity" the problem of dealing with the poor and infirm is discussed. The various pitfalls and dangers attendant upon indiscriminate charity are shown by actual examples. The problem is a serious one; but in this, as in other cases, the author finds a way of overcoming the difficulty, especially as regards garden cities which are untrammelled by established practice or tradition, and where methods such as the Elberfeld system, so successfully adopted in the town of that name and in Leipzig, and which the test of time—half a century

—has proved to be sound in principle, might quite easily be put into practice.

The work contains a wonderful amount of valuable information written in a readable style, while the illustrations are numerous, well chosen, and admirably reproduced.

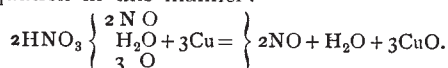
OUR BOOK SHELF.

Elementary Experimental Chemistry. By A. E. Dunstan. Pp. viii+173. (London: Methuen and Co., 1905.) Price 2s.

So many books on elementary chemistry have been published within the last few years that it is rather difficult to imagine why any more should be written, unless there is something strikingly novel in the style or matter of the book. For anything novel we search in vain in the little book before us.

After being introduced to the metric system, in chapter ii. the student is supposed to find out the difference between chemical and physical changes by having to note the effect of heat upon sulphur, lead, magnesium, and sugar, and at the end of each experiment he has to state whether the change is physical or chemical. Chapter iii. deals with air, chapter iv. with active air. In chapter x. we come to solution, which to our mind would have been better treated earlier.

Formulae are not mentioned until p. 130, and on p. 131 the union of atoms to form molecules is shown in a diagrammatic manner which we venture to think will leave the student very little wiser than before. Almost all through the book the equations are written in words and not expressed in symbols, as, for example, zinc + sulphuric acid = zinc sulphate + hydrogen. This is not necessarily objectionable in an elementary book, but to formulate all the equations which occur in the course of the book in an appendix is simply wasting type, because the student will never look at them. Furthermore, will the student understand the action of nitric acid upon copper by writing the equation in this manner?



It is then explained that the copper oxide is acted upon by a further quantity of nitric acid, &c.

Some of the experiments which the student is supposed to carry out are more for the lecture table than for the laboratory. For instance, on p. 121 the student has "to find the proportions in which oxygen and hydrogen combine to form water." Dry hydrogen and oxygen have to be collected in a eudiometer *over mercury* and then sparked. On p. 122 a similar experiment has to be carried out, but in this case to show the volume of steam formed. These are not experiments for elementary students, and we doubt whether the author himself allows his students to carry them out.

The book is very fully illustrated, and some of the exercises are undoubtedly good, but for the book to be really useful to the student will require a considerable amount of discrimination on the part of the teacher as to what experiments the student can himself be trusted to work out.

Wayside and Woodland Blossoms. By Edward Step; with coloured pictures by Mabel Step. First series, pp. xiii+176+127 plates. Second series, pp. xv+171+127 plates. (London: Frederick Warne and Co., 1905.) Price, each volume, 6s. net.

ABOUT ten years ago Mr. Step prepared two handy little volumes which many country rambles have

found of service in identifying British wild flowers and discovering something about their affinities and the significance of their structure. These volumes have now been completely re-arranged, and the plates have all been newly drawn, so that the revised edition is substantially a new work. In the original books, plants were roughly arranged in the order of the seasons in which their flowers appear, but in the present volumes a more natural grouping is followed, series i. containing representatives of the plant families from the Buttercups to the Composites inclusive, and series ii. from the Composites to the Grasses and Ferns. This arrangement is much more instructive than the former one; and in connection with the descriptions of family characters given at the end of each volume it should facilitate the further study of plants in more elaborate works.

The coloured plates in the two volumes are, with few exceptions, very fine, and will enable the country ramblers easily to identify the flowering plants he meets. In almost every case the pictures are truer to nature than those in the original volumes, though these left little cause for complaint. The picture, for instance, of Lady's Smock is much superior to that in the old edition; so is that of Germander Speedwell. The Chicory flower, however, is better represented in the old volume than in the new; and in neither is the illustration of Tamarisk satisfactory. The ideal way to depict flowers for purposes of identification would be to take tri-colour photographs of the flowers and reproduce them by the three-colour process of printing. This method, which has been successfully adopted in the illustration of a few natural history objects, might have been profitably used by Mr. Step instead of lithography. No doubt there are difficulties to be overcome, but they are not very great, and success should attend the work in which the advantages of colour photography are brought into requisition. But while we await these faithful photographic reproductions, it is good to possess Mr. Step's two pocket guides with their clear descriptions and plates, and we are glad that such attractive books exist to awaken interest in plant life.

Quiet Hours with Nature. By Mrs. Brightwen. Pp. xvi+271. (London: Fisher Unwin, 1904.) Price 2s.

MRS. BRIGHTWEN'S books no longer need to be recommended to beginners in natural history. A fresh collection of her simple and sympathetic accounts of animal and vegetable life as studied and enjoyed in her own garden and park is sure to be welcome to all boys and girls who have once begun to take an intelligent interest in natural objects. All we need say about this volume is that, besides some pleasant papers about her tamed wild animals, including squirrels, field-voles, a rook, and even a stag-beetle, which followed his benefactor across the lawn, it contains others on the trees in her garden and some of the plants in her conservatory, all well calculated to arouse just such an interest in common things as may carry the young reader on to more exact and elaborate studies of nature. The book is charmingly illustrated by photographs and drawings.

One word of criticism may be allowed. It is surely as well, in introducing young folks to the study of nature, not to lead them to think that there is an essential difference between the "professional" entomologist or ornithologist and the ordinary observant field-naturalist; or if there be a real difference, it may be as well not to emphasise it. On p. 191 Mrs. Brightwen quotes a scientific description of the head of *Eristalis tenax*, with the comment:—"Now

this may be very interesting to a professional entomologist, but it does not convey much information to an ordinary reader, and yet this is the scientific description of my drone-flies, interesting creatures which I kept through a whole winter until they were coaxed into the circle of my winged friends." It is true that the description conveys but little to an "ordinary reader," but a very little trouble will make it convey a great deal, and this small amount of trouble, or of instruction if it can be had, is exactly what our young "nature-lovers" should be encouraged to face. As it happens, the example of *Eristalis* is a good one; for the history of its confusion with the bees is a most interesting one, showing how much delusion may arise, and not only delusion, but myth, merely from the want of a little knowledge of structure.

Sammlung Schubert, XLII. Theorie der Electricität und des Magnetismus. Vol. ii. By Prof. Dr. J. Classen. Pp. ix+251; with 53 figures. (Leipzig: G. J. Göschen'sche Verlagshandlung, 1904.) Price 7 marks.

THIS forms the second part of an introductory textbook of electricity and magnetism in which chief stress is laid on the mathematical side. In this volume the Faraday-Maxwell conception of electrical phenomena still forms the central idea; but, since the representation of simple magnetic phenomena in terms of a distribution of energy in a medium presents considerable difficulty from the mathematical standpoint, the classical conception based on action at a distance is retained, but regarded merely as a mathematical device and not as a physical conception. In the section on electromagnetism the author adopts the special form of equations developed by Hertz in his paper on the fundamental equations of electromagnetism for bodies at rest, and expresses his strong opinion in favour of generally adopting these in all treatises of mathematical physics.

Only one part of Maxwell's characteristic treatment of the subject finds no place here, and that is his demonstration of the connection between the fundamental equations of electricity and the general Lagrangian equations of mechanics.

Vegetationsbilder. By Drs. G. Karsten and H. Schenck. Third series. Parts i.-iii., containing plates i.-xviii. (Jena: Gustav Fischer, 1905.)

BOTANISTS who possess the first two series of the "Vegetationsbilder," or who have had the opportunity of admiring these magnificent series of photographic reproductions, will be glad to see that the third series is rapidly taking shape. The subject of epiphytic flower-gardens arising out of ants' nests, which formed part of a previous number, by Mr. E. Ule, is more fully treated in the first part of this series by the same authority. The ant-gardeners are species of *Azteca*, most often *Azteca Traili* and *Camponotus femoratus*. The plates represent different stages in the formation of the gardens; the plants which develop from seed brought in by the ants are chiefly aroids, bromeliads, and species of Gesneraceæ. In the second part Mr. E. A. Bessey presents a study of the sand-dunes, shifting and stationary, of Russian Turkestan with a vegetation of *Calligonum*, *Salsola*, *Tamarix*, and other xerophytes; the arboreal *Salsola* is particularly interesting. The photographs of Java, forming the third part, have been supplied by Prof. M. Büsgen, Mr. H. Jensen, and Dr. W. Busse. The subjects chosen include the teak forests, an expanse of the lotus, *Nelumbium speciosum*, a sand-dune bound by the creeping *Spinifex squarrosus*, and a bamboo forest.